ary artery disease may have a normal response, but it is clear that this test is considerably more sensitive than standard ECG treadmill testing for the detection of hemodynamically significant coronary artery disease.

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Radionuclide Bone Imaging in Stress Fractures

WITH THE PRESENT INTEREST in physical fitness the incidence of stress fractures has increased. Pain, heat and swelling may occur acutely, or insidiously, without a direct association with stress. The differential diagnosis may include cellulitis, thrombophlebitis, tendonitis, malignancy, inflammation, soft tissue injury hematoma, osteosarcoma or osteomyelitis. Radiographic diagnosis may be difficult. Bone images, which reflect osteoblastic activity and blood flow, are useful in these instances, as well as in fractures of radiographically difficult bones, such as ribs, metacarpals, carpals, metatarsals, tarsals, and skull and scapula.

Stress fractures start with bone resorption during the 48 to 72 hours after stress, followed by bone remodeling, which lasts two to three weeks. When resorption is greater than replacement, the cortex is weakened and fractures may result. They are common in the femoral neck (where they may progress to an overt fracture with displacement), the tibia (usually the plateau), metatarsals, os calcis, distal femoral diaphysis and pubic rami. The treatment is rest.

A standard bone image is obtained: 10 mCi of technetium 99m diphosphonate, or a similar agent, is given intravenously. Imaging is done one to three hours later. In acute injuries the image may be negative for 24 to 48 hours, while there is vasoconstriction and discontinuity of osseous circulation. However, in one study findings were positive in 24 of 28 stress fractures during the first 24 hours. These early abnormal findings are seen in young patients, in incomplete or well-approximated fractures and in smaller bones. The abnormal image is delayed in elderly patients, if there is poor approximation or immobilization, and where there is a compromised blood supply, previous irradiation or an underlying bone abnormality such as osteoporosis.

Radionuclide images may be positive before an actual fracture occurs, explaining the observation that in patients with positive tibial plateau images who were given rest, abnormal findings never occurred on radiographs.

Bone images are useful in the diagnosis of occult fractures or those occurring in bones that are difficult to diagnose radiographically.

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Emergency Nuclear Medicine Procedures

TO MEET THE DEMAND for emergency nuclear medicine procedures, those studies whose results have an immediate effect on the patient's care have increased significantly in many laboratories. The immediate availability of technetium 99m labeled agents and improved and portable imaging cameras help provide needed information rapidly.

About half of the emergency procedures are lung perfusion studies to rule out pulmonary embolism. Abnormal studies may be further evaluated by ventilation or aerosol imaging or by angiography. A normal perfusion scan done in at least four views virtually rules out pulmonary emboli.

About 25 percent of emergency procedures are liver-spleen studies for abdominal trauma associated with a falling hematocrit, where ruptured or lacerated organs are suspected. Four or five spleen views are necessary to look for filling defects or irregular margins. In doubtful cases repeat studies may show persistence, enlargement or disappearance of the defect. Standard liver studies are also done to rule out amebic or purulent abscesses.